Serious games: an attractive approach to improve awareness of community policing technologies

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Abstract — **In situations where the cost of failure is high, or training in a real environment would be impractical and prohibitively expensive, alternatives must be considered. In particular, for security/safety-critical applications, such as community policing, citizens and Law Enforcement Officers (LEOs) need a safe and realistic environment to support their learning in handling challenging situations. In this context, the use of games can prove crucial in helping citizens improve awareness and better understand the potential value that can be developed in building relationships with Law Enforcement Agencies (LEAs) providing support within a specific area.**

Keywords—Citizen safety, Serious games, Community policing, Awareness

I. Introduction

Community policing started in the United States in the second half of the century when the rise of social disorder and crime rates was so high that LEAs had to rethink about the efficiency of their relationship with citizens and about the crime-fighting model currently in place. The need for a new police model involved also the Europe. Recognizing that police can rarely solve public safety problems on their own, community policing encourages interactive partnerships with relevant stakeholders. The community policing philosophy has consequences for the way that departments are organized and managed (personnel and technologies), encouraging the application of modern management practices to increase efficiency and effectiveness. To that

end, those changes can be enabled by Serious games, used increasingly as a form of learning. They generally aim to teach or train, often by realistically simulating some aspect of a real-world situation or system and allowing learners to explore in a manner that is highly interactive. When the objective of learning is to eventually solve real-life problems in complex situations, serious games have an advantage over more traditional learning, because they go beyond the simple provision of information and can enhance a learner's motivation, decision-making and ability to plan and evaluate stressful situations. In community policing, they can be used to assist training of Law Enforcement Officers and citizens in the uptake of technologies, such as mobile and web applications, as well as to raise citizen awareness about the opportunities offered in terms of community policing mechanisms and foster citizen engagement.

Community policing generally comprises three key components: Community Partnerships (collaborative partnerships between law enforcement agencies and citizens in order to address solutions in relation to concrete and sometimes urgent urban security problems and increase trust in police); Organizational Transformation (the alignment of organizational management, structures, personnel, and information systems to support community partnerships and proactive problem solving); Problem Solving (the process of engaging in the proactive and systematic examination of identified problems to develop and evaluate effective responses). Serious games can therefore serve the three key components (Community Partnership, Organizational transformation and Problem solving) by enabling training games for police academies, local police, municipalities and citizens.

A key factor for a successful serious game is that the *scenarios* are meaningful and realistic. Mobile and wearable *devices* represent strategic affordable facilities for enabling simulation in real environment and daily life situations. This paper presents the use of serious games in the context of the scenarios defined for the TRILLION (TRusted, CItizen - LEA coILaboratIon over sOcial Networks) project in five European cities (Lisbon, York, Ancona, Lecce and Eindhoven), which are completely different in terms of demographics, geography, culture and primary security threats. The training for citizens and for LEOs is outlined, highlighting their differences and the approach taken to provide practical games supporting the introduction of a community policing platform to citizens and officers.

II. The future of Law Enforcement

Community policing has evolved into the preeminent reform goal in modern policing, which differs from traditional policing via a shift towards more citizen involvement, geographic focus, more opportunities for interaction with citizens, and an emphasis on prevention [1, 2]. Naturally, this approach puts considerable pressure at organizational level, for moving from a top-down approach of police management to a bottom-up approach, where citizens have a more active role. Another key challenge relates to trust issues within and between the law enforcement agencies and the citizens. Motivation for engaging citizens in this community driven policing framework is also crucial. Community policing has been used successfully

in crime reduction [3], extremism prevention [4], and even in counter terrorism [5]. In all these cases, community policing was based on direct face-to-face or over-the-phone interaction between the community and LEAs. There is a growing realization that technology has the potential to accelerate the evolution towards more effective community policing [6].

TRILLION takes the concept of technology-assisted community policing further and is currently developing a community policing platform, which aims to contribute to a safer society, encouraging interactive partnerships between law enforcement officers and the people they serve, implemented over an open, flexible, secure and resilient socio-technical set of tools. Using the TRILLION applications, citizens will be able to report crimes, suspicious behavior and incidents, identify hazards and assist law enforcement agents through active participation for achieving better urban security management [18]. At the same time, LEAs will be able to detect incidents in a more efficient, content and context aware manner, locate onsite citizens, other LEA representatives and first responders, communicate with them, request more information and assign specific actions for on-going incidents. Community policing technology can improve effectiveness and efficiency., but, if not correctly used, it could be perceived as intrusive, losing public support, e.g., due to a perception of privacy invasion rather than voluntary compliance. To know the starting point about how LEAs and Citizens collaborate with an aim to make society safer, and to focus on a plausible future, the approach proposed by the RAND Corporation[1] has been adopted. RAND used several techniques to develop their scenarios, presented in a matrix where each axis represents extremes at one side, enabling each quadrant to represent a clear and distinct scenario domain.
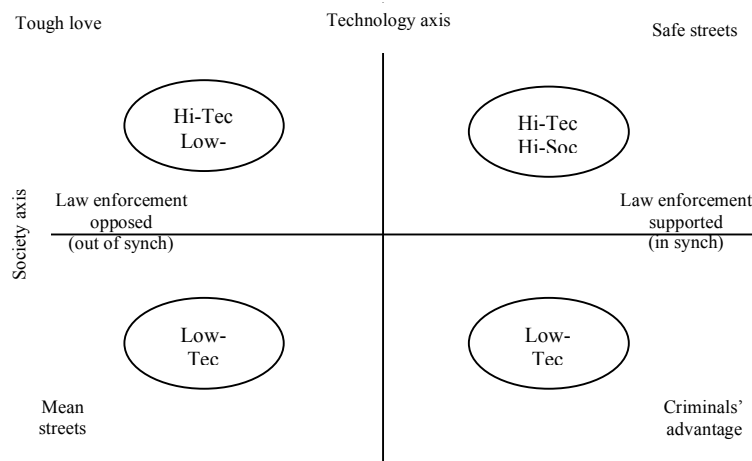

Figure 1: Use of technology and societal approval (RAND quadrants)

[1] Silberglitt R, Brian G. Chow, John S. Hollywood, Dulani Woods, Mikhail Zaydman and Brian A. Jackson. Visions of Law Enforcement Technology in the Period 2024-2034: Report of the Law Enforcement Futuring Workshop. Santa Monica, CA: RAND Corporation,: 2015.

To establish a reliable scenario framework and having in mind the importance of trust between citizens and LEAs, the adoption of the methodology proposed by RAND [7] represents a key factor. RAND's chart is based on the observation that the most important factors driving the future of law enforcement fall into two categories: Technology and Society. The effectiveness of the technology used by LEAs in order to accomplice their missions depends on the level of the technology itself (vertical axis, increasing from bottom to top) and the extent to which law enforcement practices are accepted by society (horizontal axis, increasing from left to right). As presented in Figure 1, the quadrants delimited by technology and society, create four different situations/futures, where moving to the upper right corner is the target for the serious games. In the Hi-Tec/Hi-Soc (upper right) quadrant, LEAs use advanced technology for dealing with different situations, enjoy societal support by the public. In the Low-Tec/Hi-Soc (lower right) quadrant, LEAs use obsolete technologies, but society continues to support them. In the Hi-Tec/Low-Soc (upper left) quadrant, LEAs have the advantage in use of technology, but have lost society's trust, which opposes every action they take. In the Low-Tec/Low-Soc (lower left) quadrant, LEAs use old technologies, and have to face a society which opposes every LEA measure and action.

III. TRILLION's Serious games

The TRILLION serious games were designed to be simple, easy to use, and enabling and facilitating best practices proposed in community policing.

A. Serious Games for Citizens

The serious game platform/application for citizens focuses on location, communication and interaction awareness. Its scenarios were designed having in mind technological and societal challenges taking into account the RAND approach. From the technological perspective, scenarios are driven by how advances in technology are adopted. From the societal perspective, scenarios are driven by how laws and LEAs evolve and are viewed by the public, which determines the effects of the evolution of society on law enforcement. At the end of the game, citizens are encouraged to download the mobile and wearable TRILLION apps and use them in real life to engage in community policing.

Game scenarios

The implemented scenarios are represented by non-linear storytelling, and supported by location-based mobile technologies, that will allow players to interact with virtual characters and items across an area. Virtual items collected during the gaming session will be used by players when they face the virtual event. Through creative entertainment, the serious games creators/masters, convey a positive message and "recommended behaviours" in the specific circumstances implemented in a scenario, which should be meaningful and realistic.

Architecture

The architectural solution implemented for serious games is the client-server model. The client runs on desktop or mobile personal devices, responsible for the

computational part, while the server side provides data regarding the game list and data model linked to a game (items, characters, events, requirements, actions).

Game elements

The main game elements are *items*, which are objects scattered within the boundaries of the game area and are not always useful towards the game's goal (they could be used by the game master to divert the player's attention); *characters*, which are virtual people usually linked with an audio file; *events*, which represent something that is happening and that needs the citizen's reaction; and *actions*, which are selected by the player once an event position is reached.

At the end of the game, a debriefing session allows to learn different/better behaviors and also evaluates whether the game achieved its goals, which are to enable collaborative gameplay; foster collaborative behavior; and increase citizen awareness on collaboration with LEAs in urban security and risk management.

Communities

For enabling the engagement and the collaboration of citizens/players, two different kinds of communities have been created: a community per game; and a global community that brings together all TRILLION serious games. The purpose is to stimulate discussions around the themes of the project and to enhance and strengthen the LEOs - Citizens relationship, especially for convincing reluctant citizens who see LEO's authority as an intrusion in their lives.

B. Serious Games for LEAs

The purpose of the game was to develop the skills of the LEOs in interacting with the public using the TRILLION solutions, and because its focus is on community partnership and the future use of technology by both citizens and the police, the game could be considered to sit in the Hi-Tec/Hi-Soc, upper right corner of the RAND quadrant. In terms of choosing a scenario for the game, it was felt important to provide a game which all LEOs could relate to i.e. something that was a typical occurrence for all LEOs, not a rare event such as a terrorist incident. As a result the chosen game scenario focused on anti-social behaviour. To ensure the design of the game scenario was as realistic as possible, an MD & Senior Policing, Border and Security Consultant was engaged to design the game scenario.

The game platform used was Pandora[+] [10] originally developed for an EU FP7 project entitled "Advanced Training Environment for Crisis Scenarios", which ran between Jan 2010 and March 2012 [11], [12], [13] and was built for crisis management training but is now a more general tool able to offer more generic training on any topic. The Pandora[+] training tool is a cloud-based client-server system which runs on a desktop of mobile device. Whilst it can be used in multiple ways, there are two core modes of use, the first is with a trainer who is training a group of people all working through the same game scenario, the second is where trainees / participants are working through their own game scenario independently of a trainer, and for this game, the second mode was deemed the most appropriate i.e. each LEO would play their own game. The Pandora[+] training tool is designed to provide an

immersive multimedia experience to the player(s), and works by delivering an unfolding series of events as a situation develops, that requires police involvement. For example a TRILLION citizen reporting on a fight breaking out who submits details of the suspect to the police through the TRILLION platform, sending in pictures of the incident or describing a suspect etc. The role of the LEO in the game is decide the appropriate communication with the citizens to e.g. reassure them or get further information from them. Note that the Pandora$^+$ tool has the capability to change the scenario and outcomes depending on how the player responds at different points in the game, if appropriate.

Learning outcomes

The focus of the game for the LEOs was on the communication with the citizen and their ability to compose appropriate messages etc. when presented with different situations and responses from the citizens so the learning outcomes identified for this training exercise were designed to enable the trainee to:

1. Utilise TRILLION in line with its core objectives.
2. Appreciate how a social media TRILLION-style police communication tool can assist community policing objectives and outcomes.
3. Create balanced and appropriate public safety communication messages.
4. Create balanced and appropriate messages for mobilising support from citizens for community safety goals and police efficiency.
5. Create balanced and appropriate messages for mobilising support from citizens for police investigation goals & police efficiency.

Game elements

<u>Characters</u>: the LEO (being trained), four citizens who witness the anti-social behaviour, community police colleagues, paramedics, trusted TRILLION users and two security professionals.

<u>Events</u>: as with the citizen game, these represent something that is happening, which may just be information or a situation update, or may require a response or action by the LEO.

<u>Action</u>: during the scenario the LEOs, were asked for 6 text responses which they had to compose, regarding their use of the TRILLION services.

Execution of the game

The final version of the scenario was entitled "Episode in the day of a community police officer" and lasted for about 13 minutes. The length was designed to be manageable within an appropriate timeframe / attention span of the participants, without making it too complex, whilst also being sufficient to achieve the learning outcomes. Whilst the Pandora$^+$ tool had the capacity for both the citizens and the LEOs to play the same game at the same time, the games were designed separately to ensure a consistent experience for both the citizens and the LEOs thus allowing the performance of each participant to be appropriately evaluated within the group, as everyone would have the same experience.

The game was run in the cities selected for TRILLION pilots and the scenario was presented to the participants in their native language. Participants were also able to respond in their native language and the results were translated into English so they could be analysed by the same team to ensure consistency. Tablets were used by the LEOs to access the system. There was also one person who was present at all the trials to ensure they were conducted in a consistent manner. In terms of the actual game playing event, a briefing was provide to the LEOs beforehand on how what they would experience and some information on how to use the tablet to access the system etc. The participants were then asked to play the game, note that once the game was started by the LEO, the events were delivered at fixed times so the participants were unable to slow down or speed up the delivery of the events in the scenario. After the game was finished, the person running the training session ran a debriefing session which was an important part of the learning experience. The scenario author had provided some guidance on the key aspects to look for in the messages sent to the citizens by the LEOs, for example: if it was clear who the message was sent from and directed to, whether the LEO made the type of incident, the location and timing clear, whether the request of an intended recipient was appropriately concise, clear and unambiguous, whether the LEO sought to reassure a citizen to mitigate a sense of undue fear, whether the Police message / request was balanced and proportionate to the type of incident / action requested and relevant to required policing goals etc. The scenario also provided an example of a good answer for each of the six messages required of the LEOs. A discussion about how each person had approached this, what they thought was important in each message etc. was discussed.

IV. Results

Since the scope of the games is to move the citizens' position to the upper right corner in the quadrant, the same questionnaire was submitted twice: before and after playing. The questionnaire included some questions to investigate social aspects and position Citizens' perception in RAND quadrant. The number of LEOs at each event ranging from 9 to 15 and the number of citizens ranging from 20 to 25. The responses were analysed to see if the key points, as recommended by the scenario author, were mentioned. This required some interpretation due to translation and cultural differences however, overall, the match was not high and not all responses were complete. There were a number of explanations for this, firstly the time to respond was relatively short, there are cultural differences in the style of police communication and police officers are generally not trained in this style of communication with the public etc. In some cases the LEOs did not come as a group but in couple during the day so these issues might have affected the approach and attitude of those taking part. However, overall the LEOs were positive about the TRILLION functionalities and their use in everyday life.

According to citizens' and LEOs' answers to the questionnaire, due to reported constraints, the real initial position of the test bed communities was set in the middle between left and right (with a slight propensity to be on the right hand side, see Figure 2). In summary, the public is often concerned with immediate response to

incidents, there is a lack of explanation as to when and why technology is used, and there is little sharing of information. Also, response times can be slow.
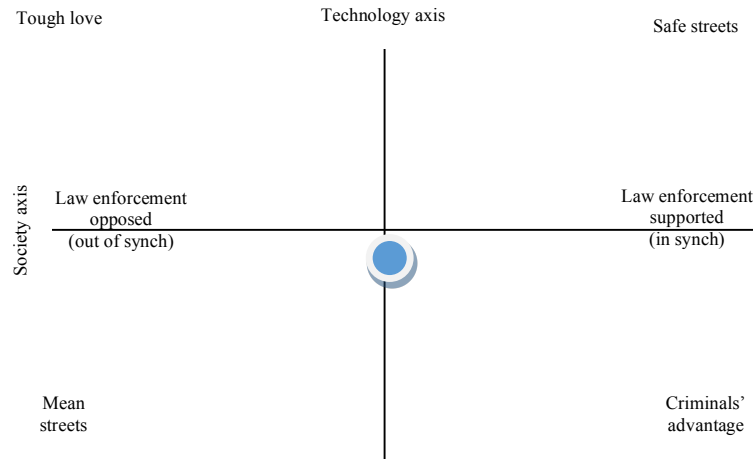

Figure 2: Initial position (before playing)

After playing, the same questionnaire was submitted to the players for the second time. The responses were analysed and the new position, as expected, was in the upper right hand quadrant.
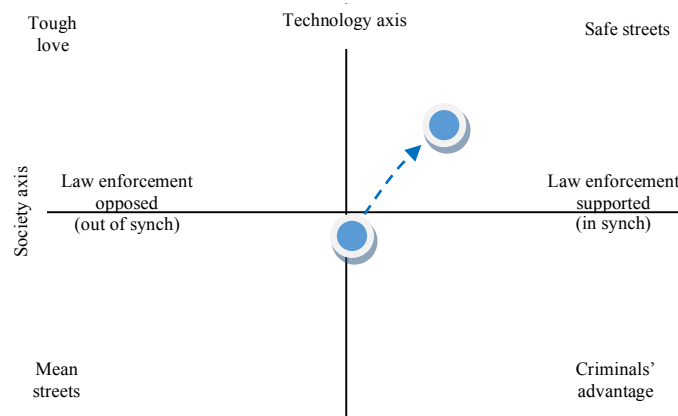

Figure 3: Final position (after playing)

V. **Conclusions**

Community policing is gradually becoming synonymous to modern policing, but from a technological perspective, this process is supported by disjointed local

initiatives, including collaborative software tools and social media monitoring services coming from National and European research initiatives like TRILLION. In particular TRILLION, serious games are used to train and educate the community in order to stimulate discussion and create awareness around the community policing mechanisms and plans and to transform the LEA-Citizen relationship for the better, especially welcoming and encouraging citizens who see LEO's authority as an intrusion in their lives.

Serious games constitute an ambitious offering, whose components are already evaluated in live trials in several locations in Europe, and in close collaboration with a variety of LEAs. The RAND document was used to understand the effectiveness of serious games. While the results coming from the serious games for citizens helped us to detect the initial and the final position of the citizens in the RAND chart, the results coming from the serious games for LEAs could be appreciated only after a long-term period.

VI. Acknowledgments

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